

## Case Report

# Therapy of Liver Subcapsular Giant Hematoma with HELLP Syndrome: Case Report and Literature Review

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**Abstract**

HELLP syndrome with liver subcapsular hematoma is a rare but catastrophic complication during pregnancy that results in high morbidity for both the mother and fetus. Two types of therapy have been established. One type is surgical therapy, and the other is conservative treatment under intense monitoring. It has been reported that surgical therapy may increase maternal loss due to the large trauma caused by surgical intervention. However, pure conservative treatment does not seem to decrease the risk of hematoma spontaneous rupture which causes over 60% mortality. Herein, we report a case with a 27-year-old patient. She accepted conservative treatment combined with transarterial embolization (TAE), which led to a good result. We also review relevant literature and discuss this therapy.

**INTRODUCTION**

HELLP syndrome with hepatic subcapsular hematoma (HSH) is a serious, rare complication during pregnancy, and the prognosis is very poor. As far as we know, no more than 200 cases have been reported in the literature (English language publications). The mortality of pregnant women with ruptured hematoma is up to 60%-86% [1,2], and the fetal death rate is 56%-75% [3]. Treatment methods may affect the outcomes of pregnant women. A retrospective analysis based on literature data by Rinehart BK et al.[4], showed that the two groups with pure hepatic artery embolization and simple exploratory laparotomy without hepatectomy or hepatic artery ligation had the highest maternal survival rate. The authors suggested that the huge trauma caused by liver surgery may be one of the causes of maternal death, and hepatic artery embolization should be the first choice for the treatment of HELLP syndrome combined with subcapsular hematoma during pregnancy. Here, we report the case of a patient who received conservative treatment with angiographic embolization, which led to a good therapeutic result.

**CASE PRESENTATION**

A 27-year-old pregnant woman, G3P1, came to hospital for progressive intermittent right upper abdominal pain starting without any inducement from 28.6 weeks. On the night of the 28.5 week, she felt a severe abdominal ache, and fetal movement disappeared. Hypertension was observed at the same time. A sonography scan at the local medical center confirmed fetal death, and a giant hypoechoic area (15×7.8×2.6 cm) was noted

in the subphrenic space. The liver capsule was suspected to be discontinuous. Blood tests revealed decreased hemoglobin (from 85 g/L to 63 g/L), and a low platelet count ( $41 \times 10^9/L$ ). At the same time, urinary protein 3+ was found in urinoscopy. The doctor performed diagnostic abdominal paracentesis and obtained some bloody liquid. Hepatic rupture with HELLP syndrome was considered. The patient was transferred to PLA General Hospital and admitted to the ward immediately.

The patient's vital signs on admission were as follows: T 37.4°C, P 121/min, RR 18/min, BP 170/120 mmHg, no encephalopathy was present. The patient had anemic countenance, generalized edema, liver was palpable 3 finger-width beneath the right costal margin, and sensitive to percussion in hepatic region. A 10-cm scar was seen in the lower abdomen. Fundal height was 25 cm, and abdomen circumference was 109 cm. Head presentation, no uterine contraction, and no fetal heart sounds. Score of cervix was 1. Laboratory studies gave the following results: hemoglobin, 100g/L; platelet count,  $67 \times 10^9/L$ ; urine protein, 150mg/dl; prothrombin time (PT), 13.3s; fibrinogen, 3.25g/L; D-dimmer, 4.42ug/ml; activated partial thromboplastin time (APTT), 37s; international normalized ratio(INR), 1.05; antithrombin III, 59%; serum creatinine level (Cr), 56.8umol/L; alanine aminotransferase (ALT), 572.4U/L; serum aspartate aminotransaminase (AST) lever, 1010.5U/L; glucose, 6.39mmol/L; lactate dehydrogenase (LDH), 1749.3U/L. The patient was given a continuous electrocardiographic monitor, and a blood transfusion was prepared in case of emergency. Conservative treatment, including antihypertensive therapy, high dose dexamethasone and magnesium sulfate was given. One unit

of platelets and 4.5 units of fresh frozen plasma were transfused. After a multi-disciplinary discussion, it was considered that the patient had a history of previous cesarean section and immature cervix, and induced labor greatly increased the risk of HSH rupture. Therefore, it was decided that a cesarean section should be performed. The hemodynamics of the patient were still stable, but the cesarean section increased the risk of hematoma rupture. Angiography embolization was recommended as the first treatment.

Arterial angiography was performed through the right femoral artery. It showed enlargement of the diameter of the right hepatic artery and the right subphrenic artery. The distal branches of the right hepatic artery were dilated and circuitous. No obvious contrast agent spillage was found. The right hepatic artery and right subphrenic artery were embolized (Figure 1). A cesarean section was performed immediately after artery embolization. In the abdominal cavity, 700 ml of dark red hemorrhagic ascetic fluid was cleaned. The lower part of the lower uterine segment was thinned to 2 mm. A non-viable male infant was removed. Intraoperative exploration did not show active bleeding on the surface of the liver. No liver surgery was performed, and 2 pelvic drainage tubes were placed, 4 units of packed red cells were transfused. Postoperative diagnosis was: G3P2 28.6 weeks gestation; HELLP syndrome; hepatic subcapsular hematoma; intrauterine fetal death. After surgery, the patient was transferred to the critical medical department for close monitoring and supportive care. The patient had a total of 3 units of red blood cells, 16.2 units of plasma. The patient was discharged on the 15<sup>th</sup> postoperative day uneventfully.

## DISCUSSION

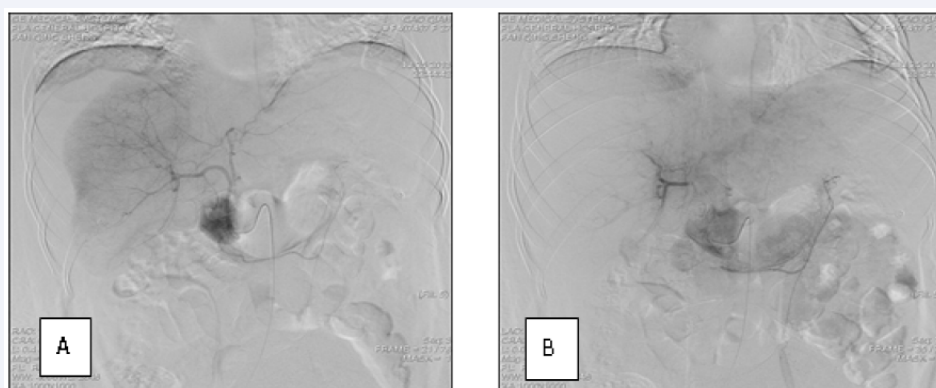
Hemolysis, elevated liver enzymes, and thrombocytopenia (HELLP) syndrome account for approximately 1% of all pregnancy complications, with a prevalence of approximately 10% to 20% in preeclampsia [5]. The severe maternal complications that HELLP syndrome may cause include disseminated intravascular coagulation (DIC), placental abruption, acute renal failure, pulmonary edema, retinal detachment, and spontaneous bleeding including hepatic and/or renal subcapsular hematoma [6]. HSH is one of the most serious complications, with an incidence of 0.9-1.6% in HELLP syndrome. HSH in HELLP syndrome could accompanied with renal hematoma in rare cases [7]. Spontaneous bleeding may also occur in other gestational

diseases, such as acute fatty liver during pregnancy or untreated DIC in pregnant women. The overall incidence of HSH in HELLP syndrome is approximately 1:40000-1:225,000 [8]. HSH may occur outside of pregnancy. The possible reasons include trauma, spontaneous, structural conditions (adenomas, hemangiomas), coagulopathies, hemodialysis, oral contraceptive use, post-liver biopsy and so on.

The mortality rate of mothers and fetuses with hepatic subcapsular hemorrhage is very high. Therefore, rapid diagnosis and effective treatment programs are very important. However, there is no guidance or expert consensus on the treatment and management of such diseases at present. The related literature is also mostly case reports and retrospective analyses.

The first important step for such patients is to transfer them to a medical center with an abundant blood supply and adequate liver surgery experience (including liver transplantation). The patient needs to be closely observed. In 2016, doctor Agnes Ditisheim [9] reviewed the relevant literature and suggested that patients with liver subcapsular hemorrhage first need to receive close monitoring in the hospital in case of early hematoma rupture. At the same time, it is necessary to prepare a large amount of blood products and to correct the abnormality of coagulation function in a timely manner. Patients with HELLP syndrome or severe preeclampsia also need to be treated with magnesium sulfate. The condition of the fetus needs to be evaluated, and the mode of delivery is determined according to the condition of the mother and fetus.

Whether or not aggressive surgical intervention should be performed for liver subcapsular hematoma in HELLP syndrome is controversial. For a long time, surgery has been the first-line treatment for liver subcapsular hemorrhage during pregnancy. Patients with high suspicion of ruptured subcapsular hematoma should be examined immediately by laparotomy. The surgical methods reported in the literature include local compression and drainage, removal of hematoma and sutured bleeding sites, local placement of hemostasis materials, partial hepatectomy, hepatic artery or portal vein ligation, or a combination of these surgical approaches. For patients presenting liver failure caused by large areas of liver necrosis or continuous hemorrhage, some authors even suggest liver transplantation [10,11]. However, some authors believe that surgical intervention increases the incidence of HSH rupture and maternal mortality. If the patient's



**Figure 1** A. Right hepatic artery angiography showed the arterial vessels in the right liver. B. After embolization of the right hepatic artery and right subphrenic artery, the arterial supply was blocked in the right liver.

hemodynamics are stable, surgical exploration could be put off under close monitoring. For patients who need surgical intervention, the extent surgery should be controlled. Aggressive procedures, such as partial hepatectomy, may not be the first choice [12].

Rinehart BK [4] reviewed 141 cases of hepatic capsular hematoma or hepatic rupture in preeclampsia. The arterial embolization group (n=10) had the highest maternal survival about 90%. The surgical exploration without resection of the liver or ligation of the hepatic arteries group (n=50) had 80% maternal survival. Data analysis showed that the possible explanation for the improved survival may be decreasing tissue handling and decreasing iatrogenic trauma to the liver in hemodynamically stable patients. However, the difference of therapy between embolization group and surgery group may partially related to less severe disease / absence of ongoing bleeding/ hemodynamic stability, as well as the fact that these were more recent cases where better coagulation products and supportive care would have been available.

Sophie Grand'Maison [13] also proposed arterial embolization as the first choice for patients with a stable general condition. The author analyzed 9 cases of HELLP syndrome with HSH in her center for the past 6 years. In all cases, the prognosis was good. Among these cases, 7 cases were treated with hepatic artery embolization. Therefore, the author believes that early diagnosis and hepatic artery embolization significantly improve the prognosis of the disease. At the same time, the efficacy use of angioembolization in liver trauma may be another supportive evidence for the treatment of HSH with HELLP syndrome. A recent systemic reviewed written by Green CS et al., showed 93% efficacy rate of angioembolization treating traumatic hepatic hemorrhage with acceptable morbidity (hepatic necrosis (15%), abscess formation (7.5%)) [14].

In the case we report here, the patient had a large liver subcapsular hematoma. The cesarean section increased the risk of hematoma rupture. Once the intraoperative or postoperative hematoma ruptures, fatal bleeding may occur. Therefore, the risk of conservative treatment was unpredictable. The use of angiographic embolization blocked the arterial blood supply to the right liver and reduced blood flow and hematoma tension. It would be helpful to avoid surgical intervention and to control the degree of trauma. The hepatic artery is known to account for only 25% of blood flow, whereas it accounts for 50% of oxygen supply in the total liver. The arterial blood supply is of great importance to the biliary system [15,16]. Therefore, the use of angiographic embolization may increase the risk of liver abscess and biliary complications [17,18]. In conclusion, for hemodynamically stable patients, minimally invasive treatment of liver subcapsular bleeding during pregnancy may be a possible option to improve the prognosis of patients.

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### Cite this article

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